AMENDMENTS TO THE CLAIMS

A listing of all claims and their current status in accordance with 37 C.F.R. § 1.121(c) is provided below.

1. (currently amended) ~~An apparatus for spatially homogenizing electromagnetic energy transmitted from different sources~~A physiological sensor, comprising:

a first inlet configured to receive electromagnetic energy transmitted from a first source;

a second inlet configured to receive electromagnetic energy transmitted from a second source;

means for spatially homogenizing the electromagnetic energy transmitted from the first source with the electromagnetic energy transmitted from the second source in a non-random configuration to form a spatially-homogenized multi-source electromagnetic energy configured to enable measurement of a physiological parameter of a subject; and

an outlet configured to deliver the spatially-homogenized multi-source electromagnetic energy to a tissue location of the subject for the measurement of the physiological parameter.

2. (currently amended) The ~~apparatus~~physiological sensor of claim 1 wherein the means for spatially homogenizing comprises:

a first bundle of optical fibers having a first proximal end originating at the first inlet and a first distal end terminating at the outlet; and

a second bundle of optical fibers having a second proximal end originating at the second inlet and a second distal end terminating at the outlet;

wherein ~~at the outlet~~ each first distal end of each fiber of the ~~fibers of the~~ first bundle of fibers is spatially mixed in an alternating configuration with each second distal end of each fiber of the ~~fibers of the~~ second bundle of fibers, so as to form a spatially-homogenized multi-source electromagnetic energy ~~received from the first and the second inlets~~ at the outlet.

3. (currently amended) The ~~apparatus~~physiological sensor of claim 2 comprising a cladding surrounding the first bundle and the second bundle of optical fibers, the cladding having a first cladding proximal end at the first inlet, a second cladding proximal end at the second inlet and a cladding outlet at the outlet.

4. (currently amended) The ~~apparatus~~physiological sensor of claim 1 wherein:

the electromagnetic energy from the first source is in a first spectral region;

the electromagnetic energy from the second source is in a second spectral region, wherein the second spectral region is different from the first spectral region; and

the spatially-homogenized multi-source electromagnetic energy is a spatially-homogenized multi-spectral electromagnetic energy.

5. (currently amended) A physiological sensor ~~for measuring a physiological parameter~~, comprising:

a first source of electromagnetic energy;

a second source of electromagnetic energy;

an apparatus ~~for~~ configured to spatially ~~homogenizing~~ homogenize electromagnetic energy transmitted from the first and second sources, the apparatus comprising:

a first inlet configured to receive electromagnetic energy transmitted from the first source;

a second inlet configured to receive electromagnetic energy transmitted from the second source;

means for spatially homogenizing the electromagnetic energy transmitted from the first source with the electromagnetic energy transmitted from the second source in a non-random configuration to form a spatially-homogenized multi-source electromagnetic energy; and

an outlet configured to deliver the spatially-homogenized multi-source electromagnetic energy to [[the]] a blood-perfused tissue location; and

light detection optics configured to receive the spatially-homogenized multi-source electromagnetic energy from the blood-perfused tissue location for measuring the physiological parameter.

6. (currently amended) The physiological sensor of claim 5 wherein the means for spatially homogenizing comprises:

a first bundle of optical fibers having a first proximal end originating at the first inlet and a first distal end terminating at the outlet;

a second bundle of optical fibers having a second proximal end originating at the second inlet and a second distal end terminating at the outlet;

wherein at the outlet each first distal end of each fiber of the fibers of the first bundle is spatially mixed in an alternating configuration with each second distal end of each fiber of the fibers of the second bundle, so as to form a spatially-homogenized multi-source electromagnetic energy received from the first and the second inlets.

7. (currently amended) The physiological sensor of claim 6 comprising a cladding surrounding the first bundle and the second bundle of optical fibers, the cladding having a first cladding proximal end at the first inlet, a second cladding proximal end at the second inlet and a cladding outlet at the outlet.

8. (currently amended) The physiological sensor of claim 5 wherein:

the first source transmits electromagnetic energy in a first spectral region;

the second source transmits electromagnetic energy in a second spectral region; and

the spatially-homogenized multi-source electromagnetic energy is a spatially-homogenized multi-spectral electromagnetic energy.

9. (currently amended) The physiological sensor of claim 8 wherein the first source and the second source are configured to transmit electromagnetic energy in the range approximately between 500 and 1850 nm.

10. (currently amended) The physiological sensor of claim 8, wherein the first source is configured to transmit electromagnetic energy at approximately 660 nm.

11. (currently amended) The physiological sensor of claim 8 wherein the second source is configured to transmit electromagnetic energy in the range approximately between 890 and 940 nm.

12. (currently amended) The physiological sensor of claim 5 wherein the sensor is an oximeter sensor.

13. (currently amended) A physiological sensor, comprising:

a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from a first source, the first plurality of optical fibers having proximal ends and distal ends; [[and]]

a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from a second source, the second plurality of optical fibers having proximal ends and distal ends, wherein the proximal ends of the second plurality of optical fibers are segregated from the proximal end of the first plurality of optical fibers; and

an outlet configured to emit a spatially homogenized electromagnetic energy into a tissue location of a subject to enable measurement of a physiological parameter, the outlet comprising ~~wherein the proximal ends of the first plurality of optical fibers are segregated from the proximal ends of the second plurality of optical fibers, and wherein~~ the distal ends of the first plurality of optical fibers [[are]] arranged in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers ~~such that the transmitted electromagnetic energy from the first~~

~~first source is spatially homogenized with the transmitted electromagnetic energy from the second source~~.

14. (currently amended) The <u>physiological</u> sensor of claim 13, comprising light detection optics to receive the spatially homogenized ~~transmitted~~ electromagnetic energy <u>emitted</u> from the ~~first and second sources~~<u>outlet</u>.

15. (previously presented) A system comprising:

a first source of electromagnetic energy;

a second source of electromagnetic energy;

a monitor configured to calculate a physiological parameter; and

a sensor adapted to be operatively coupled to the monitor, the sensor comprising:

a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from the first source, the first plurality of optical fibers having proximal ends and distal ends; and

a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from the second source, the second plurality of optical fibers having proximal ends and distal ends;

wherein the proximal ends of the first plurality of optical fibers are segregated from the proximal ends of the second plurality of optical fibers, and wherein the distal ends of the first plurality of optical fibers are arranged in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers such that the transmitted electromagnetic energy from the first source is spatially homogenized with the transmitted electromagnetic energy from the second source.

16. (previously presented) The system of claim 15, wherein the first source and the second source are configured to transmit electromagnetic energy in the range approximately between 500 and 1850 nm.

17. (previously presented) The system of claim 15, wherein the first source is configured to transmit electromagnetic energy at approximately 660 nm.

18. (previously presented) The system of claim 15, wherein the second source is configured to transmit electromagnetic energy in the range approximately between 890 and 940 nm.

19. (currently amended) A method of manufacturing a physiological sensor, the method comprising:

providing a first plurality of optical fibers configured to receive and to transmit electromagnetic energy from a first source, the first plurality of optical fibers having proximal ends and distal ends;

providing a second plurality of optical fibers configured to receive and to transmit electromagnetic energy from a second source, the second plurality of optical fibers having proximal ends and distal ends; ~~and~~

arranging the distal ends of the first plurality of optical fibers in a spatially mixed non-random configuration with the distal ends of the second plurality of optical fibers such that transmitted electromagnetic energy is spatially homogenized at an outlet of the sensor; and

providing light detection optics configured to detect attenuation of the spatially homogenized electromagnetic energy emitted from the outlet.

20. (currently amended) A method of ~~homogenizing multi-source electromagnetic energy~~measuring a physiological parameter, ~~the method~~ comprising:

transmitting electromagnetic energy from a first source through a first plurality of optical fibers configured to receive and to transmit the electromagnetic energy, the first plurality of optical fibers having proximal ends and distal ends;

transmitting electromagnetic energy from a second source through a second plurality of optical fibers configured to receive and to transmit the electromagnetic energy, the second plurality of optical fibers having proximal ends and distal ends; [[and]]

outputting spatially homogenized electromagnetic energy of the first and the second source from an outlet region comprising the distal ends of the first and second plurality of optical fibers, wherein the distal ends are arranged in a non-random configuration;

detecting attenuation of the output spatially homogenized electromagnetic energy at a tissue location; and

determining a physiological parameter based on the detected attenuation.